

CLAIMS

1. A workpiece conveying apparatus comprising a robot having a hand to grip a workpiece and conveying the workpiece, and a visual sensor,

wherein said visual sensor comprises:

image pick-up means for capturing an image of a characteristic portion of the workpiece that is being conveyed by said robot; and

position detecting means for detecting, on the basis of an image of the characteristic portion obtained by said image pick-up means, the position of the characteristic portion of the workpiece observed when the image is captured, wherein

said visual sensor recognizes the gripped state of said workpiece while the workpiece is being conveyed by the robot, on the basis of the positions of the robot and the characteristic portion of the workpiece observed when the image is captured.

2. The workpiece conveying apparatus according to claim 1, further comprising means for storing in advance a predetermined gripped state established by the hand of said robot;

means for comparing the predetermined gripped state with the gripped state, recognized by said visual sensor when an image is captured, and determining an error; and

means for stopping the robot when the error exceeds a predetermined tolerance limit or means for issuing a signal indicative of a fault.

3. The workpiece conveying apparatus according to claim 1, further comprising means for storing in advance a predetermined gripped state established by the hand of said robot;

means for comparing the predetermined gripped state with the gripped state recognized by said visual sensor to determine an error; and

means for correcting a position to which said robot conveys the workpiece, on the basis of the error.

4. The workpiece conveying apparatus according to any of claims 1 to 3, wherein said gripped state is provided by a relative position and posture between an arm tip or said hand of said robot and said workpiece.

5. The workpiece conveying apparatus according to any of claims 1 to 3, wherein means for detecting the positions of the robot observed when the image is captured is provided in a robot controller, and

the robot controller comprises means for synchronizing an image pick-up instruction given to said image pick-up means with the detection of the position of the robot, observed when the image is captured, by means of said detecting means.

6. The workpiece conveying apparatus according to claim 5, wherein the imaging instruction synchronized with the detection of the position of the robot observed when the image is captured is repeatedly executed a number of times.